

Irrigation Management of Canola

The Argentine varieties of canola are one of two varieties of canola grown in southern Alberta. Canola belongs to the mustard family and is closely related to the turnip, cabbage and cauliflower.

Canola is an important cash crop in Western Canada. It is utilized for both the edible oil content and protein content of the meal. By ensuring that sufficient water is available for crop use, the oil content of canola increases and the protein content of the meal decreases.

Compared to flax, which is fairly drought tolerant, canola tends to be more sensitive to stress throughout its entire growth cycle.

At the germination and seedling stages, canola is quite sensitive to soil salinity levels above 2dS/m. As it matures, canola tolerance for soil salinity increases (5 to 10dS/m).

Crop Water Requirements and Crop Yield

In areas where there are no soil restrictions, canola will develop an active rooting zone of approximately 1.0 m (3.3 ft) during the growth period. The growing season for canola extends from mid-May to mid-August. During this period the crop will use approximately 480 mm of moisture. Over a 30-day period, average peak crop water use will range from 6.0 to 6.5 mm/day (0.25 in./day). When the crop is in its vegetative stage of growth, the daily rate of water use will range from 1.5 to 3.0 mm/day (0.06 to 0.12 in./day). As the crop begins to flower and the ground becomes 100 per cent covered, water use will be at a maximum of 7.5 mm/day (0.30 in./day) (See Figure 1). Canola obtains nearly 70 per cent of its water requirements from the top half metre of the root zone.

Root development gradually reaches maximum depth about the time flowering occurs (75 to 85 days), after which root development is minimal. Maintaining good soil moisture conditions throughout the root zone lengthens the flowering period and increases the number of flowers that form seeds, the number of seeds per pod, seed weight and in some cases seed oil content.

The highest yields of canola will be obtained when adequate soil moisture is maintained throughout the growing season. The most critical water requirement period for canola is from the time flowering begins to the

initial seed ripening period. Limiting water during this time will result in fewer pods, early leaf loss and reduced yields. Since the period for flowering can cover up to a 30-day interval with a potential crop use of 200 mm (8 in.) of water, it is almost impossible to avoid irrigation during this time if adequate moisture conditions are to be maintained for optimum production.

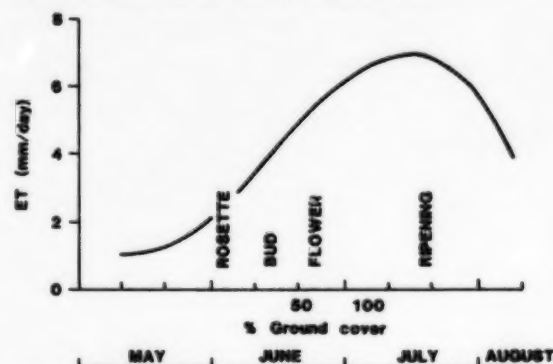


Figure 1. Crop water use of canola during the growing season.

Canola requires good moisture conditions up to the pod ripening stage. Irrigation should normally be continued until one week prior to swathing to achieve top yields. Figure 2 reveals the relationship between water use and yield when other production factors are taken into consideration.

Comments

Fall irrigation is recommended when levels of available soil moisture fall below the 50 per cent allowable depletion level after harvest. Soil moisture conditions must be determined for the root zone before water is applied to ensure that over-irrigation does not occur and that sufficient room is available in the root zone for any precipitation that occurs over winter. The amount of water applied should refill the root zone to the 50 per cent allowable depletion level.

Due to the nature of its small seed and shallow seeding requirements, canola should have sufficient moisture in the seed bed in order for it to germinate. If the seed bed is dry, a light application of water (25 mm) may be required for germination to occur. Applying too

much water may cause germination to be delayed because of the cooling effect of irrigating early or by causing the soil surface to crust.

The method of irrigation used plays an important role in growing canola. For producers who surface irrigate, poor germination may be a problem with dry seed bed conditions and a limited amount of water available for irrigation.

For producers who have center pivots, generally no problems exist other than trying to keep ahead of the crop water requirements. Those producers who utilize the side wheel roll to irrigate canola are faced with the problem of crop height versus system height. The final irrigation should even occur, if necessary, before the 50 per cent allowable depletion level is reached. This will ensure that the entire field has sufficient moisture available for full crop development.

Irrigation Management Information

For further information regarding irrigation management of canola, contact your nearest Irrigation Branch office. These offices are located at: Lethbridge, 381-5136; Vauxhall, 654-2161; Airdrie, 948-8511; Taber, 223-7908; Strathmore, 934-3356; Brooks, 362-1212; Bow Island, 545-2231; Medicine Hat, 529-3616. North of Calgary, contact the Airdrie office or your local district agriculturist for assistance.

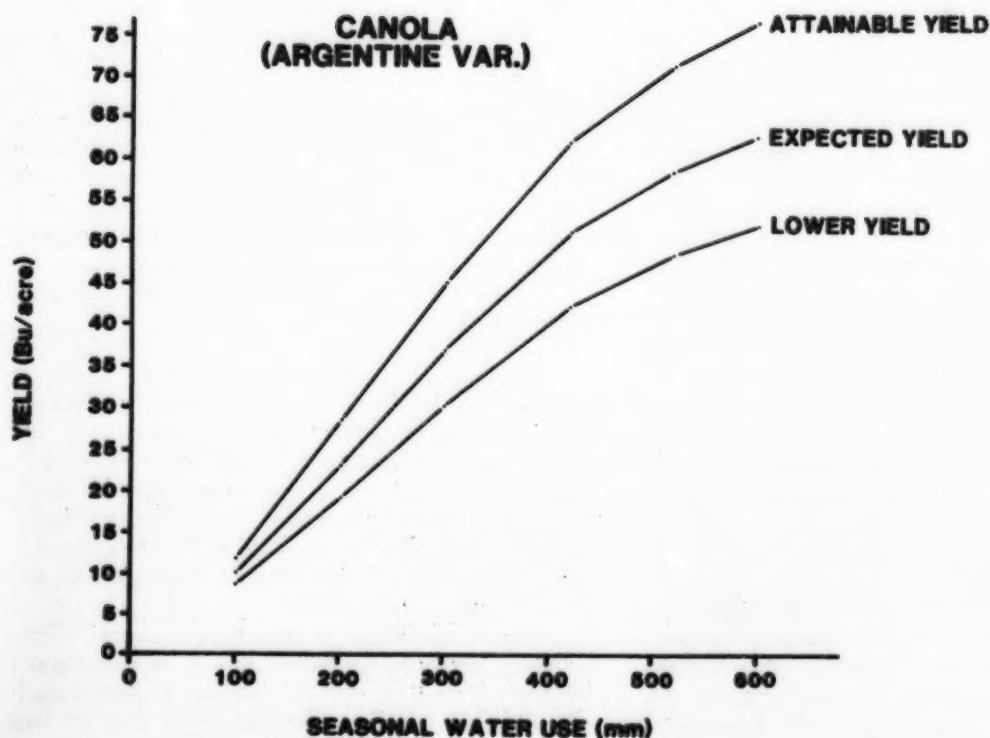
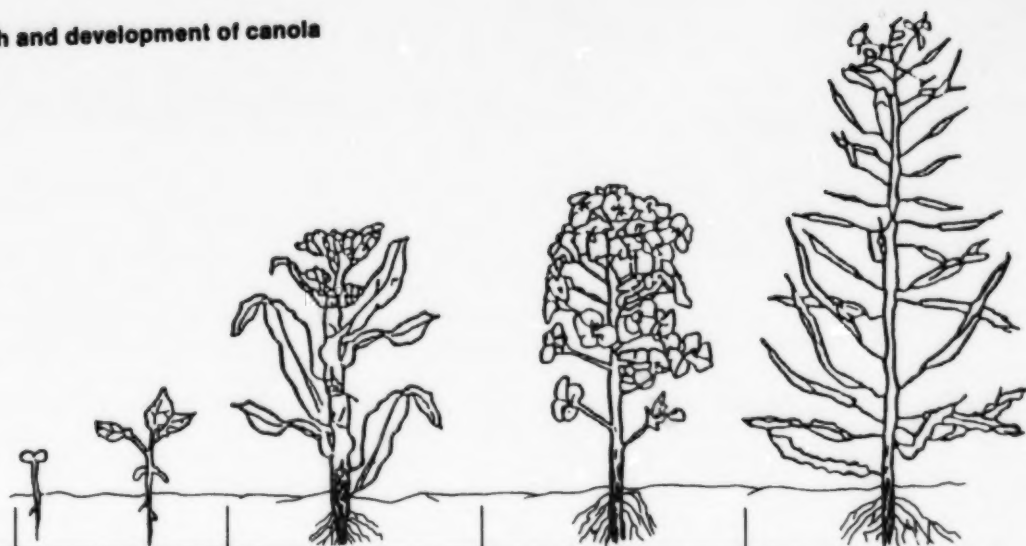


Figure 2

Growth and development of canola



GROWTH PERIODS	VEGETATIVE	BUD	FLOWERING	RIPENING
POST EMERGENCE DATES	25 - 30 DAYS	45 - 50 DAYS	75 - 85 DAYS	105 - 110 DAYS
CROP * ROOT DEPTH	2.0cm/DAY	2.5cm/DAY	MINIMAL ROOT EXTENSION	
MOISTURE SENSITIVE PERIOD **				
AVERAGE E.T.	1.0 - 3.0mm/DAY	3.0 - 5.0mm/DAY	5.0 - 7.0mm/DAY	< 7.0mm/DAY

* Maximum rooting depth will occur approximately by the time flowering begins.

** For optimum production, the first irrigation will be required before the crop enters into its water sensitive period. The above times, depths and amounts are only average values for this particular crop. These values will change depending on the variety and area where this crop is grown.

Soil

Soils can vary greatly in texture from being very fine (clay) to very coarse (sand) within a crop root zone. Because soil texture can change quite quickly, so can the amount of water that the soil is able to hold.

Texture	Available Moisture
Loamy sand	8-12 mm/0.1 m (0.9-1.4 in./ft)
Sand loam	10-15 mm/0.1 m (1.2-1.8 in./ft)
Loam	14-18 mm/0.1 m (1.7-2.1 in./ft)
Sand clay loam, clay loam, clay	15-20 mm/0.1 m (1.8-2.4 in./ft)
Silty clay loam, silt loam	16-22 mm/0.1 m (1.9-2.6 in./ft)

It is important to know and to be able to calculate the amount of moisture present in the soil root zone in order to understand the amount of moisture available for crop use. The allowable depletion level is the amount of soil moisture that can safely be removed from the root zone by a crop before an irrigation is required. For canola, the allowable depletion level has been determined to be 50 per cent. The simplest way to determine soil moisture content is by the "feel" method. By feeling, squeezing and observing a handful of soil, one can determine the amount of moisture present in the soil. The following chart outlines the various characteristics of soil based on different contents of water.

	Feel or Appearance of Soils			
	PERCENT OF AVAILABLE MOISTURE REMAINING	MODERATELY COARSE TEXTURE	MEDIUM TEXTURE	MODERATELY FINE TEXTURE
DO NOT IRRIGATE	At field capacity 100	Upon squeezing no free water appears on soil but wet outline of ball is on left hand.	Same as sandy loam.	Same as sandy loam.
	75 to field capacity	Forms a weak ball, breaks easily, will not slide.	Forms a ball and is very pliable; slicks readily if relatively high in clay.	Easily ribbons out between fingers, has a slick feeling.
IRRIGATE SPEC. CROPS	50 to 75	Tends to ball under pressure but seldom will hold together	Forms a ball; somewhat plastic; will sometimes slick slightly with pressure.	Forms a ball, will ribbon out between thumb and forefinger.
IRRIGATE	25 to 50	Still appears to be dry, will not form ball with pressure.*	Somewhat crumbly but will hold together from pressure.	Somewhat pliable, will ball under pressure.
	0 to 25	Dry, loose, single-grained, flows through fingers.	Powdery, dry, sometimes slightly crusted but easily breaks down into powdery condition.	Hard, baked, cracked; sometimes has loose crumbs on surface.

* Ball is formed by squeezing a handful of soil firmly.